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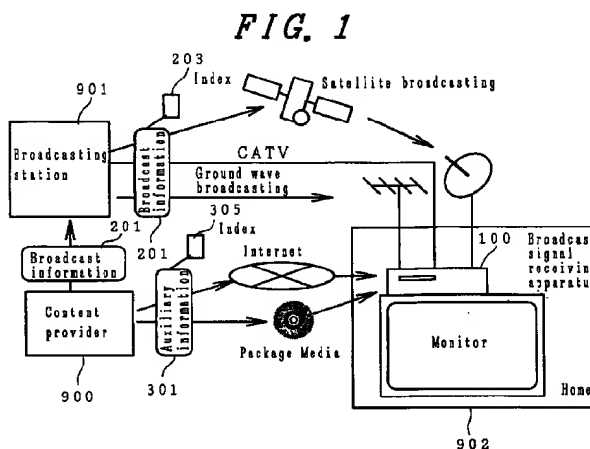
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(54) BROADCASTING METHOD AND BROADCAST RECEIVER

(57) The present invention relates to a broadcasting method and a broadcast signal receiving apparatus wherein auxiliary information such as video and audio data for supplementing broadcast information presented through a broadcasting network in an interlocked manner can be watched and listened to by the viewer.

Broadcast information received from a broadcasting network is temporarily stored in a storage means of a broadcast signal receiving apparatus and a recording medium for storing auxiliary information used as a supplement to the broadcast information is mounted on the broadcast signal receiving apparatus. The broadcast information and the auxiliary information are then played back in an interlocked manner with predetermined timing. As a result, a function to present information which can not be accommodated in a broadcast frame and a pair rental function can be implemented.



Description

Technical Field

[0001] The present invention relates to a broadcast-
ing method and a broadcast signal receiving apparatus
for presenting contents of video information such as a
picture through a broadcasting network, more particu-
larly, to a broadcasting method and a broadcast signal
receiving apparatus wherein information presented
through a broadcasting network and auxiliary informa-
tion presented through other media such as package
media can be watched and listened to in an interlocked
manner.

Background Art

[0002] In the conventional system, edited video /
audio information is broadcasted during a broadcasting
band of time set as a program. Thus, the viewer can
watch and listen to only part of such video / audio infor-
mation actually broadcasted by a broadcasting station.
For example, in the case of a news program, only part of
gathered video information can be watched and listened
to. In the case of a movie program, on the other hand,
only part of a movie presented at a movie theater can
be watched during the period of the movie program usu-
ally shorter than the show time of the movie at the movie
theater.

[0003] Meanwhile, in recent years, there has been
implemented a data broadcasting system whereby text
data related to video / audio information is broadcasted
as additional data to the video / audio information by
appending the text data in the blanking signal of the
video information. For example, systems called IT -
vision and Intel - Intericast are known. In these data
broadcasting systems, text data is described in a prede-
termined language such as an HTML (Hyper Text
Markup Language) in a signal period of time of a video
signal not used in video transmission to be broadcasted
along with the video signal at the same time. An exam-
ple of the signal period of time is an VBI (vertical blank-
ing interval). In the broadcast signal receiving
apparatus, incoming video / audio information and text
data are separated from each other. The video / audio
information is played back as it is while the text data is
displayed on a screen of a computer as a message
related to the video information such as a text, a static
picture or a graphic. In this way, the viewer is capable of
not only watching and listening to the video / audio infor-
mation but also obtaining information on its program at
the same time.

[0004] In the data broadcasting system whereby
auxiliary information is broadcasted by using the VBI
with a low information transmission capacity, however,
there is a limit on the amount of auxiliary information
that can be transmitted at a time, making it impossible to
broadcast a large amount of data such as video infor-

mation as auxiliary information. While video information
and related information are broadcasted at the same
time, they are independent of each other, thus, difficult
to utilize related information in a process of synthesizing
a video information such as a search for original infor-
mation based on the related information and correlation
of a scene cut out from a movie with the original movie.

Disclosure of the Invention

[0005] It is an object of the present invention to pro-
vide the viewer with video / audio data which can not be
included in broadcast information so far as an auxiliary
information by using a means adopting a broadcasting
procedure different from the normal broadcasting pro-
cedure wherein the auxiliary information is synthesized
automatically in the broadcast signal receiving appara-
tus with the broadcast information to generate final
information which appears to the viewer as if the final
information had been broadcasted as a continuous sin-
gle program.

[0006] According to the present invention, broad-
cast information received by the broadcast signal
receiving apparatus during a predetermined program
band of time is played back in a manner interlocked with
auxiliary information received in advance and held in
the receiving apparatus.

Brief Description of Drawings

[0007] Embodiments of the present invention will be
described by referring to the following diagrams
wherein:

Fig. 1 schematically shows a package media inter-
locked broadcasting / watching / listening system;
Fig. 2 shows the system configuration of a 1st
embodiment implementing a broadcast signal
receiving apparatus;
Fig. 3 shows the data format of broadcast informa-
tion received by the 1st embodiment;
Fig. 4 shows the data format of auxiliary information
received by the 1st embodiment;
Fig. 5 shows a typical data format of an auxiliary
information control table;
Fig. 6 shows a typical video recording control table;
Fig. 7 shows a sequence of user operations;
Fig. 8 shows 2 different algorithms adopted by a
video synthesizing unit for synthesizing broadcast
information and auxiliary information;
Fig. 9 shows the system configuration of a 2nd
embodiment implementing a broadcast signal
receiving apparatus;
Fig. 10 shows the data format of broadcast informa-
tion and auxiliary information received by the 2nd
embodiment; and
Fig. 11 shows the data format of auxiliary informa-
tion handled in a 3rd embodiment.

Best Mode for Carrying Out the Invention

[0008] Fig. 1 explains the concept of a package media interlocked broadcasting / watching / listening system. In the system, contents of a broadcast program are created by a contents provider 900 and the contents are partly delivered to a broadcasting station 901 as broadcast information 201. The broadcasting station 901 broadcasts the broadcast information 201 through the infrastructure such as a satellite, a ground wave facility or a CATV. The contents provider 900 also distributes other information related to the broadcast information 201, through the Internet and package media, as auxiliary information 301. The viewer side(at a home 902) receives the broadcast information 201 and the auxiliary information 301 through a broadcast signal receiving apparatus 100 to display the information on a monitor. In the package media interlocked broadcasting / watching / listening system, auxiliary information 301 supplements broadcast information 201. Both auxiliary information 301 and broadcast information 201 include indexes 305 and 203 respectively for associating the former with the latter and for specifying how and with what timing the former supplements the latter.

[0009] The following is a description of an example to which the package media interlocked broadcasting / watching / listening system is applied.

[0010] When distributing the contents of a large size theater movie, scenes in the movie are cut out to be the length of the broadcast information contents provider 900 adjusted to a broadcast time. The contents provider 900 delivers the movie-through-the-cutting-process to a broadcasting station, as broadcast information, to thereby be broadcasted to homes. On the other hand, the cut out scenes are sent to the homes as auxiliary information through other means such as the Internet, package media and data broadcasting systems. A broadcast signal receiving apparatus at each home receives the broadcast information and the auxiliary information, thereafter, displays both the pieces of information on a monitor in the interlocked manner based on indexes appended to both. This enables the viewer to watch and listen to the contents of the complete movie. In a news program, part of news not broadcasted can also be presented to the viewer as auxiliary information. As a result, there is born a new information distribution business for distributing and delivering more detailed subjects, which are not broadcasted as a news program, as auxiliary information in the way described above.

[0011] The package media interlocked broadcasting / watching / listening system can also be applied to pair rental control. A pair rental control function prevents pictures and expressions of the original work inappropriate for juvenile viewers from being displayed. To be more specific, portions of the original work for general viewers are broadcasted as broadcast information whereas scenes for adult viewers are only delivered

separately as auxiliary information by using typically package media. This allows the viewer to select whether or not such auxiliary information is to be displayed at a time to watch and listen to a broadcast program, implementing the pair rental control function to appropriately exclude such scenes from displayed information. Thus, chances that scenes inappropriate for juvenile viewers are inadvertently watched and listened to are eliminated.

[0012] Moreover, the package media interlocked broadcasting / watching / listening system can also be applied to broadcast advertisements (CMs). To put it in detail, by delivering a CM such as a product advertisement as auxiliary information, the CM can be played back in synchronization with a program properly. As a result, the number of opportunities in which a product advertisement is presented to the viewer in addition to CMs included in broadcast information can be increased. By setting an auxiliary information CM time in addition to the traditional CM time, the broadcasting station is capable of increasing the advertisement revenue. In addition, the CM provider is capable of appending a CM relevant to a program to the program broadcasted by a broadcasting station that does not broadcast the CM. For example, an index of the name of a program' included in broadcast information can be used to play back an advertisement of a product such as a car appearing in the program from a CD-ROM with timing specified by the index. In this way, the CM provider is capable of letting the viewer watch and listen to a CM even if the broadcast station does not broadcast the CM.

[0013] The following is a description of an application of computer graphics to the package media interlocked broadcasting / watching / listening system. If the playback apparatus includes a processor that is capable of executing a program, auxiliary information played back in a manner interlocked with an operation to display broadcast information will not be limited to video and audio data described above. For example, a CG program, a program displaying computer graphics (CG), can be provided as auxiliary information. That is, a CG program can be delivered as auxiliary information by using package media. Invocation of a CG program is triggered by index information included in broadcast information. By providing a parameter required for a CG program from a broadcast information, a CG character moving synchronously with the broadcasting is let appear on a displayed screen of the broadcast information. Such an application is particularly effective for programs such as an animation one. The viewer is capable of carrying out operations such as replacing some characters appearing in an animation program with CG characters selected from package media. If the viewer is also capable of creating a CG character by itself, the viewer will be able to enjoy to see a CG character created by itself appearing and acting in a broadcasted program. Such a joy can not be realized by the conven-

tional TV broadcasting.

[0014] In the mean time, standardization including one known as MPEG4 is making progress in recent years. In the video and audio encoding field, a technology called content based encoding has been implemented. The content based encoding is a technology wherein video materials (or objects) included in video data is encoded independently and, on the receiving side, the objects are decoded individually and finally synthesized before being displayed. In this technology, since only information on objects that change in the video data is transmitted, not only is it possible to considerably reduce the amount of information to be transmitted, but other merits can also be reaped by a video data producer. The other merits include a capability of creating entirely new video data by combination of pieces of video data of objects photographed individually. With this content based encoding used in transmission of broadcast information, if the package media interlocked broadcasting / watching / listening system using a broadcast signal receiving apparatus provided by the present invention is adopted, video data of some objects included in a broadcast signal can be replaced by video data of other objects recorded in a piece of exactly resembling package media.

[0015] For example, video data of a 1st person appearing in a program and video data of a 2nd person other than the 1st person are each subjected to content base encoding with the 2nd person closely imitating behaviors of the 1st person. The encoded data of the 1st person is broadcasted as part of broadcast information while the encoded video data of the 2nd person is recorded on package media for distribution. If only the broadcast information is received and played back, the 1st person will appear in a program as it is along with other objects such as a background. If the broadcast information is played back in a manner interlocked with the package media, on the other hand, the viewer will be capable of watching and listening to video data wherein the 1st person is replaced by the 2nd person.

[0016] The following is a description of a broadcast signal receiving apparatus of the present invention which makes the package media interlocked broadcasting / watching / listening system described above feasible.

[0017] Fig. 2 shows the system configuration of a 1st embodiment implementing a broadcast signal receiving apparatus 100 provided by the present invention. As shown in the figure, the broadcast signal receiving apparatus 100 comprises:

- a broadcast signal receiving means 101 for receiving broadcast information 201;
- a storage means 106 such as a hard disc drive for temporarily storing broadcast information 201 received by the broadcast signal receiving means;
- a removable media drive 104 for inputting auxiliary information 301;

- an input means 107 for inputting a user intention;
- a processor 102 for carrying out processing to convert broadcast information 201 and auxiliary information 301 into a video signal;
- a display unit 108 such as a color monitor for displaying information;
- a display means 103 for converting video data generated by the processor 102 into a signal to be displayed on the display unit 108; and
- a memory unit 105 used for storing programs to be executed by the processor 102 and temporarily storing data in the course of signal processing carried out by the processor 102.

[0018] While it is desirable to put a mountable as well as removable random - access medium such as a CD - ROM, a DVD and an MO in the removable media drive 104, a sequential medium such as a tape is also acceptable as well.

[0019] Broadcast information 201 is stored in the storage means 106 in program units. When the viewer watches and listens to a program, broadcast information 201 stored in the storage means 106 is transferred to the processor 102 which then carries out processing such as decoding on the broadcast information 201 by using the memory unit 105 as a work area. A result of the processing is then output to the display means 103. If an index is extracted from the broadcast information 201 during the processing, auxiliary information 301 indicated by the index is read out from a medium mounted on the removable media drive 104. Processing is then carried out on the auxiliary information 301 and a result of the processing is output also to the display means 103.

[0020] It should be noted that means used for furnishing auxiliary information 301 are not limited to media such as a CD - ROM. Auxiliary information 301 can also be supplied to the broadcast signal receiving apparatus 100 by way of a network such as the Internet or a data broadcasting system such as a satellite broadcasting system or a ground wave broadcasting system. In this case, auxiliary information 301 received from a partner on the Internet or a broadcasting station of the data broadcasting system is transferred to the storage means 106 or the memory unit 105 shown in Fig. 2 to be stored therein. In either case, the auxiliary information 301 stored in the recording means 106 or the memory unit 105 is played back in a manner interlocked with broadcast information 201.

[0021] Fig. 3 shows the data format of broadcast information 201 received by the 1st embodiment. As shown in the figure, a plurality of program indexes 203 are inserted between pieces of video and audio data of each program. Each of the program indexes 203 includes information such as a program ID 204 for uniquely identifying a broadcast program, a program name 205 given to the program, a start time 206 of the program, an end time 207 of the program and one or

more auxiliary information IDs 208 each for identifying a piece of auxiliary information 301 to be interlocked during an operation to play back the program. In the case of an analog broadcast signal, a program index 203 is embedded in a VBI region of the video signal by using the ordinary NTSC system video signal. In the case of a digital broadcast signal, on the other hand, a program index 203 is broadcasted as a control packet other than the video signal.

[0022] It is desirable to insert a plurality of program indexes 203 into a program. This is because, if a program index 203 is inserted into only the head of a program, no program index 203 can be acquired in a recording or playback operation of the program starting from a position after the only one program index 203, making it impossible to play back the program in a mode interlocked with auxiliary information 301 with the auxiliary information 301 used as a supplement to broadcast information 201. By inserting a plurality of program indexes 203 into a program, however, this problem can be solved. A program index 203 may include auxiliary information IDs 208 of all pieces of auxiliary information 301 to be interlocked with the program or include auxiliary information IDs 208 of only pieces of auxiliary information 301 to be interlocked with the program starting from a point into which the program index 203 is inserted.

[0023] Fig. 4 shows the data format of auxiliary information 301 received by the 1st embodiment. As shown in the figure, auxiliary information 301 comprises a plurality of individual auxiliary information pieces 304 and an auxiliary information control table 303 for centrally controlling the individual auxiliary information pieces 304. Each of the individual auxiliary information pieces 304 comprises audio / video data 306 and an auxiliary information index 305 including information for identifying a partner program to be supplemented by the video / audio data 306. The auxiliary information index 305 comprises an auxiliary information ID 307 for distinguishing the individual auxiliary information pieces 304 from each other, the title 308 of the individual auxiliary information piece 304, a partner program ID 309 for identifying a partner program to be supplemented by the video / audio data 306, a supplementation start time 310 with the beginning of a partner program to be supplemented taken as a base, a supplementation end time 311 and time length information 312 of the individual auxiliary information piece 304.

[0024] Fig. 5 shows a typical data format of the auxiliary information control table 303. As shown in the figure, the auxiliary information control table 303 is a single collection of attributes of auxiliary information indexes 305 of all individual auxiliary information pieces 304 and storage locations 401. That is, each line of the auxiliary information control table 303 comprises attributes of an auxiliary information index 305 and one storage location 401. A storage location 401 is an address in a medium or a storage device at which the

video / audio data 306 of the individual auxiliary information piece 304 is stored. The auxiliary information indexes 305 cataloged in the auxiliary information control table 303 are sorted by partner ID 309. Note that it is desirable to automatically copy the auxiliary information table 303 into the storage means 306 at the time the medium storing the auxiliary information table 303 is mounted on the removable media drive 104. With the auxiliary information control table 303 copied into the storage means 106, a search of the table 303 for a desired piece of information can be carried out at a high speed.

[0025] Next, a package media interlocked broadcasting / watching / listening method is explained. The package media interlocked broadcasting / watching / listening method comprises the steps of:

carrying out a recording operation to record broadcast information 201 into the storage means 106; and
carrying out a synthesis / playback operation to play back a program while supplementing the broadcast information 201 with individual auxiliary information pieces 304.

First of all, the recording operation is explained by referring to Figs. 2 to 6. The viewer records broadcast information 201 into the storage means 106 in the same way as a TV program is recorded into a VTR (video tape recorder). In the case of a storage means 106 implemented by a digital information storage means such as a hard disc, an analog broadcast signal is converted into a digital signal such as an MPEG stream by a video capture in the broadcast signal receiving means 101 and the resulting digital signal is then stored in the storage means 106. The viewer is allowed to specify a recording time in the case of reserved recording or unattended recording, or carry out a manual operation to start and end the recording. The processor 102 receives and stores incoming broadcast information 201 in accordance with a request coming from a timer not shown in the figure in the case of unattended recording or a request made by the viewer in the case of manual recording. At that time, the broadcast signal receiving apparatus 100 catalogs the recorded program into a video recording control table 501, a table for cataloging recorded programs, like one shown in Fig. 6. As shown in the figure, each line in the video recording table 201 comprises a program ID 204 as well as a program name 205 extracted from a program index 203 of the broadcast information 201, a recording start time 504, a recording end time 505 and a recording location 506 or an address in the storage means 106 indicating the beginning of an area for storing the broadcast information 201. It should be noted that the recording start time 504 and the recording end time 505 shown in the video recording control table 501 are times with a program start time 206 of the recorded program taken as a

reference. That is to say, the recording start time 504 and the recording end time 505 are obtained by subtracting the program start time 206 from the time the recording is actually started and the time the recording is actually ended respectively.

[0026] Next, a typical synthesis / playback operation is explained by referring to Figs. 2 to 7. In order to obtain individual auxiliary information pieces 304 to be used for supplementing a program, a recording medium containing auxiliary information 301 is mounted on the removable media drive 104. When the recording operation described above is not carried out, the broadcast signal receiving apparatus 100 carries out a through operation wherein the processor 102 processes incoming broadcast information 201 and displays the processed broadcast information on the display unit 108 by way of the display means 103 as is the case with an operation to receive an ordinary television broadcast program. For control purposes, the processor 102 displays a playback button 602 on the screen of the display unit 108 as shown in Fig. 7A.

[0027] When the viewer selects the playback button 602 by using a cursor 601 or presses a playback request button provided on the input means 107 such as a remote controller, the broadcast signal receiving apparatus 100 displays a recorded program menu 603 created at that time from the video recording control table 501 on the display unit 108 in order to let the viewer select a program recorded in the storage unit 106 to be played back. The viewer then selects a desired recorded program from the recorded program menu 603 as shown in Fig. 7B by specifying the program name thereof. As the name of the desired recorded program is specified, the video recording control table 501 is searched for the name 205 of the desired program and the program ID 204 thereof is acquired.

[0028] Next, the processor 102 forms a decision as to whether or not auxiliary information 201 can be acquired from a recording medium mounted on the removable media driver 104. The decision is formed by determining whether or not the program ID 204 of the selected program acquired from the video recording control table 501 exists as a partner program ID 309 in the auxiliary information control table 303 which was copied from the recording medium into the storage means 106 when the recording medium was mounted on the removable media drive 104 for the first time. If the outcome of the decision indicates that auxiliary information 201 can not be acquired, that is, if no partner program ID 309 in the auxiliary information control table 303 matches the program ID 204, supplementation of the program by auxiliary information 201 is ignored. The processor 102 then searches the video recording control table 501 using the program ID 204 as a key for the recording location 506. Subsequently, the processor 102 reads out the program from the location 506 to play back it. If the outcome of the decision indicates that aux-

iliary information 201 can be acquired, that is, if a partner program ID 309 in the auxiliary information control table 303 matches the program ID 204, on the other hand, the matching partner program ID 309 is used for fetching attributes 307 to 312 and storage locations 401 of each auxiliary information index 305 associated with the desired program to be played back from the auxiliary information control table 303. An auxiliary information menu 604 shown in Fig. 7C is then displayed on the screen. It should be noted more than one auxiliary information index 305 in the auxiliary information control table 303 may have a partner program ID 309 matching the program ID 204, that is, more than one individual auxiliary information piece 304 may be associated with the desired program. As shown in Fig. 7C, the auxiliary information menu 604 includes a table of individual auxiliary information pieces 304 associated with the desired program and a 'Select all' button which is operated if it is desired to specify all the individual auxiliary information pieces 304. Beneath the auxiliary information menu 604, the following buttons 605 to 607 are also displayed on the screen shown in Fig. 7C. The 'Play back auxiliary information' button 605 is selected if it is desired to play back only the individual auxiliary information pieces 304. On the other hand, the 'Playback program' button 606 is selected if it is desired to play back the broadcast information 201 only, ignoring the individual auxiliary information pieces 304. Finally, the 'Synthesis / Playback' button 607 is selected if it is desired to play back the program by supplementing the broadcast information 201 of the program with the individual auxiliary information pieces 304.

[0029] Assume that the viewer selects an 'auxiliary information 1' item representing one of the individual auxiliary information pieces 304 listed on the auxiliary information menu 604 and the 'Synthesis / Playback' button 607. In this case, the processor 102 searches the video recording control table 501 using the program ID 204 as a key for a recording location 506, a recording start time 504 and a recording end time 505 of the specific broadcast information 201 to be played back. Then, the processor 102 searches the auxiliary information control table 303 for a recording location 401 of the individual auxiliary information piece 304 corresponding to the 'auxiliary information 1' selected from the auxiliary information menu 604 to be synthesized and played back with the specific broadcast information 201, a supplementation start time 310 and a supplementation end time 311 of the individual auxiliary information piece 304 used in the synthesized playback.

[0030] The recording start time 504 of the specific broadcast information 201 to be played back is compared with the supplementation start time 310 of the individual auxiliary information piece 304 to be synthesized. Since the recording start time 504 and the synthesis start time 310 are both given with the program start time taken as a reference, the comparison can be decided to be justifiable. Video and audio data of the

information with the smaller start time is played back as shown in Fig. 7D.

[0031] An individual auxiliary information piece 304 is played back as follows. The processor 102 compares the supplementation start time 310 of the individual auxiliary information piece 304 with the contents of a timer also taking the program start time as a reference all the time. As the contents of the timer become equal to the supplementation start time 310, the operation to play back the broadcast information 201 is temporarily suspended and an operation to play back the individual auxiliary information piece 304 is started. As the operation to play back the individual auxiliary information piece 304 is finished, the operation to play back the broadcast information 201 is resumed beginning with a portion at the supplementation start time 310 or the supplementation end time 311 of the individual auxiliary information piece 304. If the operation to play back the broadcast information 201 is resumed beginning with a portion at the supplementation start time 310, the individual auxiliary information piece 304 is merely inserted into the broadcast information 201. A method of synthesis to insert an individual auxiliary information piece 304 into broadcast information 201 is referred to as an insertion type synthesis method. If the operation to play back the broadcast information 201 is resumed beginning with a portion at the supplementation end time 311, on the other hand, the individual auxiliary information piece 304 replaces part of the broadcast information 201 between the supplementation start time 310 and the supplementation end time 311. A method of synthesis to replace part of broadcast information 201 with an individual auxiliary information piece 304 is referred to as a replacement type synthesis method. The insertion type synthesis method and the replacement type synthesis method will be exemplified in concrete terms later.

[0032] If the 'Play back auxiliary information' button 605 shown in Fig. 7C is selected by the user, only individual auxiliary information pieces 304 are played back sequentially one piece after another beginning with one with a smallest supplementation start time 310 shown in the auxiliary information control table 303. If the 'Play back program' button 606 shown in Fig. 7C is selected by the user, on the other hand, only the broadcast information 201 selected from the menu shown in Fig. 7B is played back. In addition, interface buttons 608 resembling buttons on a remote controller used for controlling an ordinary VTR are displayed on the screen as shown in Fig. 7D. The interface buttons 608 allow the user to specify operations to start, halt, temporarily halt, run fast and rewind the playback of the video data. When the user specifies the operation to halt the operation by operating one of the interface buttons 608, the broadcast signal receiving apparatus 100 terminates the operation to play back video data and resets the timer.

[0033] In the above description, there is assumed a method whereby broadcast information 201 is recorded

into the storage means 106 shown in Fig. 2 in program units and, in an operation to play back a program, broadcast information 201 of the program is synthesized with auxiliary information 301. If the read / write speed of a hard disc drive used as the storage means 106 is not high enough to keep up with the recording and playback operations, however, part of the memory unit 105 can be used as a buffer between the processor 102 and the storage means 106. The buffer allows the operations to record broadcast and play back information 201 into and from the storage means 106 to appear as if they were carried out concurrently. As a result, the package media interlocked broadcasting / watching / listening method can be applied to a program which is currently being broadcasted.

[0034] The buffer cited above works as follows. Broadcast information 201 received by the broadcast signal receiving means 101 is stored in a 1st buffer area in the memory unit 105. As the amount of stored broadcast information 201 reaches a predetermined value, the broadcast information 201 is transferred to the storage means 106 at one time as a batch. While the transfer is being carried out, the operation to store broadcast information 201 received by the broadcast signal receiving means 101 can be continued. In the mean time, broadcast information 201 transferred to and recorded in the storage means 106 is transferred back to a 2nd buffer area in the memory unit 105 in appropriate units to be played back. Pieces of broadcast information 201 in the 2nd buffer area are sequentially processed one piece after another by the processor 102 and output to the display means 103. In this way, while currently broadcasted broadcast information 201 is being recorded in the storage means 106, a playback operation can be continued at a time delay to a certain degree. While such simultaneous recording and playback operations are being carried out in this way, auxiliary information 301 can be used as a supplement in accordance with program indexes included in the broadcast information 201 being played back. Time delays are resulted in due to supplementation by using auxiliary information 301. However, such time delays can be absorbed by the simultaneous recording and playback operations. If the insertion type synthesis method described above is taken as a technique of supplementation, the time delay between broadcast information being recorded and broadcast information 201 being played back is widened. If the capacity of the storage means 106 is larger than a size corresponding to the time delay, however, there will be no missed information at all.

[0035] Fig. 8 shows two different algorithms adopted in a synthesis of broadcast information 201 and auxiliary information 301. To be more specific, Fig. 8A is a diagram showing the insertion type synthesis method and Fig. 8B shows the replacement type synthesis method. As shown in Fig. 8A, in the case of the insertion type synthesis method, the broadcast signal receiving

unit 100 plays back auxiliary information 1 denoted by reference numeral 306 after playing back video and audio data 202 of broadcast information 201 denoted by notation M1 till a point of time T1. After the operation to play back auxiliary information 1 is finished, the operation to play back the video and audio data 202 of the broadcast information 201 is resumed starting with a portion M2 at the point of time T1. In this way, auxiliary information 1 is merely inserted at the point of time T1 into the video and audio data 202 of the original broadcast information 201. In the case of the replacement type synthesis method shown in Fig. 8B, on the other hand, as the operation to playback the auxiliary information 1 is finished at a point of time T2, the operation to play back the video and audio data 202 of the broadcast information 201 is resumed starting with a portion M3 at the point of time T2. In this way, auxiliary information 1 replaces the portion M2 between the points of time T1 and T2 of the video and audio data 202 of the original broadcast information 201.

[0036] It should be noted that, in an effort made in the actual implementation to adjust timing in a playback operation, auxiliary information 301 is read out earlier than an accurate start time and stored in a cache memory. By doing so, the auxiliary information 301 can be played back with good timing without causing the viewer to feel a sense of incompatibility. In addition, if inter-frame encoding is carried out to produce an MPEG stream, a frame on an encoding boundary, that is, an I frame in the case of MPEG encoding, is adjusted to coincide with a boundary between broadcast information 201 and auxiliary information 301.

[0037] Next, a 2nd embodiment implementing a broadcast signal receiving apparatus provided by the present invention is explained. In the case of the 2nd embodiment, auxiliary information 301 is also transmitted in the same way as broadcast information 201 instead of being delivered by using a recording medium. Fig. 9 shows the system configuration of the 2nd embodiment. Since, auxiliary information 301 is also transmitted as is the case with broadcast information 201, as shown in the figure, the 2nd embodiment is obtained by omitting the removable media drive 104 from the system configuration of the 1st embodiment shown in Fig. 2. Instead, an information separating program 801 stored in the memory unit 105 is used for separating auxiliary information 301 from broadcast information 201 received by the broadcast signal receiving means 101. A method for acquiring auxiliary information 301 in an operation to record video data is also different from that adopted in the 1st embodiment implementing the broadcast signal receiving apparatus 100 shown in Fig 2.

[0038] An operation to record video data carried out in the 2nd embodiment is explained as follows. The broadcast signal receiving apparatus 100 receives broadcast information 201 and auxiliary information 301 relevant thereto transmitted by a broadcasting station. Fig. 10 shows the data format of the broadcast informa-

tion 201 and the auxiliary information 201 received by the 2nd embodiment. The auxiliary information 301 is embedded in a program index 203. The processor 102 executes the program 801 to extract auxiliary information 301 from information received by the broadcast signal receiving means 101 and store the information in the storage means 106.

[0039] It should be noted that, in some cases, a large amount of auxiliary information 301 can not be transmitted by including the auxiliary information 301 in a program index 203 of broadcast information 201 as shown in Fig. 10 due to broadcasting specifications. In such a case, auxiliary information 301 is transmitted by splitting it into a plurality of packets. Typically, such packets are transmitted in advance independently of the associated broadcast information 201 prior to the time band of the program of the broadcast information 201. The processor 102 employed in the broadcast signal receiving apparatus 100 stores auxiliary information 301 included in each packet. As the last packet is received, pieces of auxiliary information 301 are arranged in an order of sequence numbers included in the packets to reconstruct the entire auxiliary information 301. The 2nd embodiment allows the viewer to automatically acquire auxiliary information 301 by receiving a broadcast signal without the need to resort to another means such as a recording medium used in the 1st embodiment for distributing auxiliary information 301.

[0040] Next, a 3rd embodiment of the present invention is explained. In the case of the 3rd embodiment, the contents of auxiliary information 301 are a CG program, a sentence written in the HTML or an operation described as a script. In one typical version of the 3rd embodiment, link information described in the HTML is received as auxiliary information 301. Video data generated by a source on the Internet is then acquired by tracing the link and displayed by executing a browser program. In another typical version of the 3rd embodiment, a program for generating and displaying CGs (computer graphics) is received as auxiliary information 301. Then, by directly executing this CG program, CG video data can be displayed. Fig. 11 shows the data format of auxiliary information 301 handled by the 3rd embodiment. As shown in the figure, an individual auxiliary information piece 304 comprises an auxiliary information index 305 and a program or a script 1001. The auxiliary information index 305 includes a data type field 1002 indicating the data type of the program or the script 1001. When executing a program or a script 1001, the processor 102 refers to the data type field 1002, adjusting the execution of the program or the script 1001 to the data type specified in the field 1002.

[0041] Unlike an operation to play back video and audio data, the execution time of a program or a script much depends on the performance of the processor 102 carrying out processing and the complexity of a network including a data source indicated by a link specified as auxiliary information 301. It is thus difficult to

estimate the length of the execution time. For this reason, the auxiliary information index 305 includes a processing time field 1003. A positive value set in this processing time field 1003 is an effective period of time during which a result of execution of the program or the script 1001 is to be displayed. As the period of time lapses, the operation of the broadcast signal receiving apparatus is automatically switched to an operation to play back video and audio data 202 of broadcast information 201 of the program. On the other hand, a negative value set in this processing time field 1003 indicates that the execution of the program or the script 1001 is continued till an instruction to end the execution is issued by the viewer. Thus, in the case of a positive value set in this processing time field 1003, the processor 102 keeps monitoring the execution time while the program or the script 1002 of auxiliary information 201 is being executed. By virtue of the 3rd embodiment, it becomes possible to provide the viewer with auxiliary information 301 including computer graphics, numbers, texts and figures in addition to video data by using various kinds of media.

Industrial Applicability

[0042] The present invention makes a package media interlocked broadcasting / watching / listening system feasible. In the package media interlocked broadcasting / watching / listening system auxiliary information relevant to broadcast information is distributed by using for example package media and, by playing back and displaying the auxiliary information and the broadcast information synchronously, the broadcast information can be supplemented with the auxiliary information.

Claims

1. A broadcast signal receiving method whereby broadcast information broadcasted during a predetermined time band and received by a broadcast signal receiving apparatus is displayed in a manner interlocked with auxiliary information stored in said broadcast signal receiving apparatus in advance.
2. A broadcast signal receiving method according to claim 1 whereby said auxiliary information is stored in a recording medium that can be mounted on and dismounted from said broadcast signal receiving apparatus.
3. A broadcast signal receiving method according to claim 1 whereby said auxiliary information is transmitted to said broadcast signal receiving apparatus through a broadcasting system or a network and stored in a storage unit employed in said broadcast signal receiving apparatus.
4. A broadcast signal receiving method according to claim 1 wherein said broadcast information and said auxiliary information each include video and audio data, said method comprising the steps of:
 - storing said video and audio data of received broadcast information in a storage unit employed in said broadcast signal receiving apparatus;
 - playing back said video and audio data stored in said storage unit; and
 - stopping the step of playing back said video and audio data stored in said storage unit with predetermined start timing and then playing back said video and audio data of said auxiliary information.
5. A broadcast signal receiving method according to claim 4 further comprising the step of stopping playing back said video and audio data of said auxiliary information with predetermined end timing and then resuming the stopped step of playing back said video and audio data stored in said storage unit beginning with a portion of said video and audio data stored in said storage unit immediately succeeding a point of time corresponding to said predetermined start timing.
6. A broadcast signal receiving method according to claim 4 further comprising the step of stopping playing back said video and audio data of said auxiliary information with predetermined end timing and then resuming the stopped step of playing back said video and audio data stored in said storage unit beginning with a portion of said video and audio data stored in said storage unit immediately succeeding a point of time corresponding to said predetermined end timing.
7. A broadcast signal receiving method according to claim 4 whereby broadcast information currently being broadcasted and said auxiliary information are played back at the same time by concurrently storing said video and audio data of said currently broadcasted broadcast information in a storage unit and playing back said video and audio data stored in said storage unit.
8. A broadcast signal receiving method according to claim 1 wherein said broadcast information includes video and audio data whereas said auxiliary information includes a program or a script, said method comprising the steps of:
 - storing said video and audio data of received broadcast information in a storage unit employed in said broadcast signal receiving apparatus;

playing back said video and audio data stored in said storage unit; and

stopping the step of playing back said video and audio data stored in said storage unit with predetermined start timing and then playing back said program or said script of said auxiliary information.

9. A broadcast signal receiving method according to claim 8 whereby, if said program or said script is not executed in a processing period of time determined in advance, execution of said program or said script is canceled.

10. A broadcasting method for broadcasting broadcast information to be played back in a manner interlocked with auxiliary information stored in a broadcast signal receiving apparatus in advance wherein:

said auxiliary information has an auxiliary information index including a program ID for identifying a program to be interlocked and an auxiliary information ID for identifying said auxiliary information to be interlocked with said program; and
said broadcast information includes a plurality of program indexes for each program.

11. A broadcast signal receiving apparatus comprising:

a storage unit for recording received broadcast information broadcasted during a predetermined program time band;
a read unit for reading out auxiliary information from a recording medium mounted on said broadcast signal receiving apparatus to be played back in a manner interlocked with said broadcast information; and
a processor for playing back said broadcast information recorded in said storage unit and said auxiliary information stored in said recording medium in a manner of interlocking said broadcast information with said auxiliary information by controlling read operations carried out by said read unit with predetermined timing.

12. A broadcast signal receiving apparatus comprising:

a storage unit for recording broadcast information and auxiliary information; and
a processor for controlling an operation to read out broadcast information or auxiliary information from said storage unit with predetermined timing,
wherein said broadcast information is received through a broadcast system to be recorded in said storage unit and said auxiliary information

is received through a broadcast system or a network to be recorded in said storage unit.

13. A broadcast signal receiving apparatus according to claim 11 or 12 wherein broadcast information currently being broadcasted is played back in a manner interlocked with said auxiliary information by concurrently executing operations to record and play back said broadcast information into and from said storage unit.

14. A broadcast signal receiving apparatus according to claim 11 or 12 wherein said processor stops an operation to play back video and audio data of said broadcast information with predetermined start timing and then plays back video and audio data of said auxiliary information.

15. A broadcast signal receiving apparatus according to claim 14 wherein said processor further stops playing back said video and audio data of said auxiliary information with predetermined end timing and then resumes said stopped operation to play back said video and audio data of said broadcast information beginning with a portion of said video and audio data of said broadcast information immediately succeeding a point of time corresponding to said predetermined start timing so that said video and audio data of said auxiliary information is inserted into said broadcast information.

16. A broadcast signal receiving apparatus according to claim 14 wherein said processor further stops playing back said video and audio data of said auxiliary information with predetermined end timing and then resuming said stopped operation to play back said video and audio data of said broadcast information beginning with a portion of said video and audio data of said broadcast information immediately succeeding a point of time corresponding to said predetermined end timing so that said video and audio data of said auxiliary information replaces said video and audio data of said broadcast information between said points of time corresponding to said predetermined start timing and said predetermined end timing.

17. A broadcast signal receiving apparatus according to claim 11 or 12 wherein:

said broadcast information includes video and audio data whereas said auxiliary information includes a program or a script; and
said processor plays back said program or said script of said auxiliary information with predetermined start timing in a manner interlocked with said video and audio data stored in and then played back from said storage unit.

18. A broadcast signal receiving apparatus according to claim 17 wherein, if said program or said script is not executed in a processing period of time determined in advance, execution of said program or said script is canceled. 5
19. A recording medium for storing auxiliary information to be played back in a manner interlocked with a predetermined broadcast program wherein: 10
- said auxiliary information includes a plurality of individual auxiliary information pieces; the same plurality of individual auxiliary information pieces each comprise video and audio data of said individual auxiliary information 15 piece to be played back in a manner interlocked with a program and an auxiliary information index including an auxiliary information ID for identifying said individual auxiliary information piece as well as a program ID for identifying 20 said program with which said individual auxiliary information piece is to be interlocked.
20. A recording medium according to claim 19 wherein said auxiliary information index of each of the same 25 plurality of individual auxiliary information pieces also includes time information for determining timing with which an operation to play back said individual auxiliary information piece in a manner interlocked with said broadcast information is to be 30 started and ended.
21. A recording medium for storing auxiliary information to be played back in a manner interlocked with a predetermined broadcast program wherein: 35
- said auxiliary information includes a plurality of individual auxiliary information pieces; the same plurality of individual auxiliary information pieces each comprise a software pro- 40 gram or a script of said individual auxiliary information piece to be played back in a manner interlocked with a broadcast program and an auxiliary information index including an auxiliary information ID for identifying said individ- 45 ual auxiliary information piece as well as a program ID for identifying said broadcast program with which said individual auxiliary information piece is to be interlocked. 50

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FIG. 1

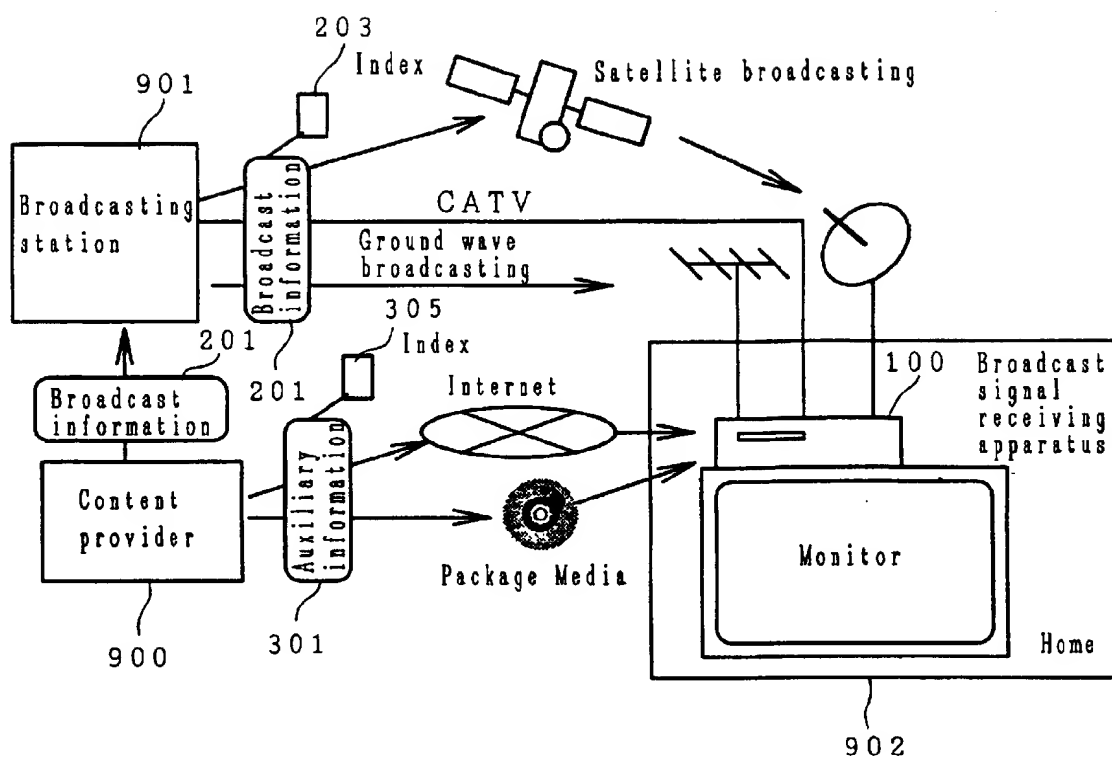


FIG. 2

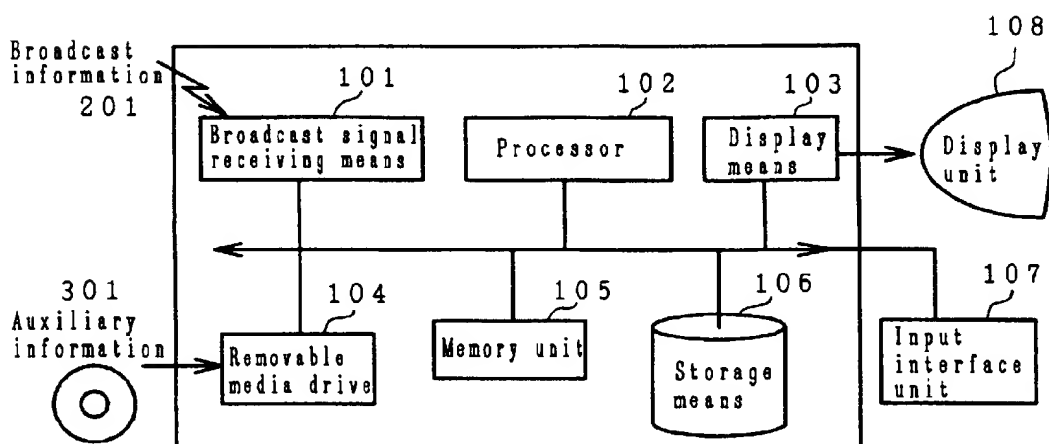


FIG. 3

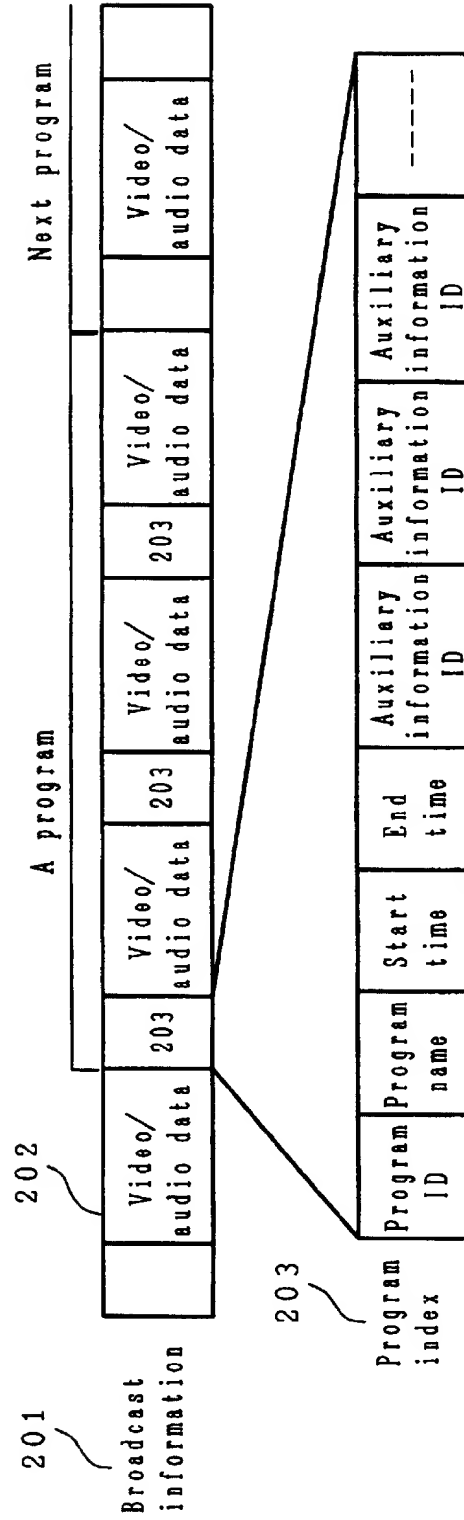
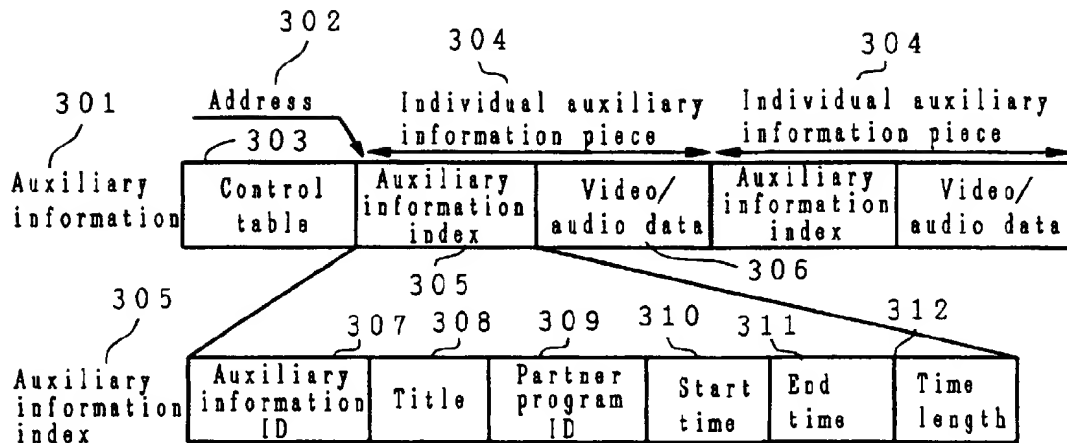


FIG. 4**FIG. 5**

Control table (303)						
Partner program ID (309)	Auxiliary information ID (307)	Title (308)	Storage location (401)	Start time (310)	End time (311)	Time length (312)
1001	5001	Cut scene 1	Address 1	0:15:00	0:17:30	0:02:30
1001	5002	Special CM	Address 2	0:40:30	0:41:30	0:01:00
1003	5003	Player message	Address 3	1:00:00	1:10:00	0:10:00

FIG. 6

Control table (501)				
Program ID (204)	Program name (205)	Recording start time (504)	Recording end time (505)	Recording location (506)
1001	News 1	0:00:00	0:30:00	Address 1
1002	Weather forecast	0:00:00	0:14:55	Address 2
1003	Drama 1	0:10:15	1:49:45	Address 3

FIG. 7

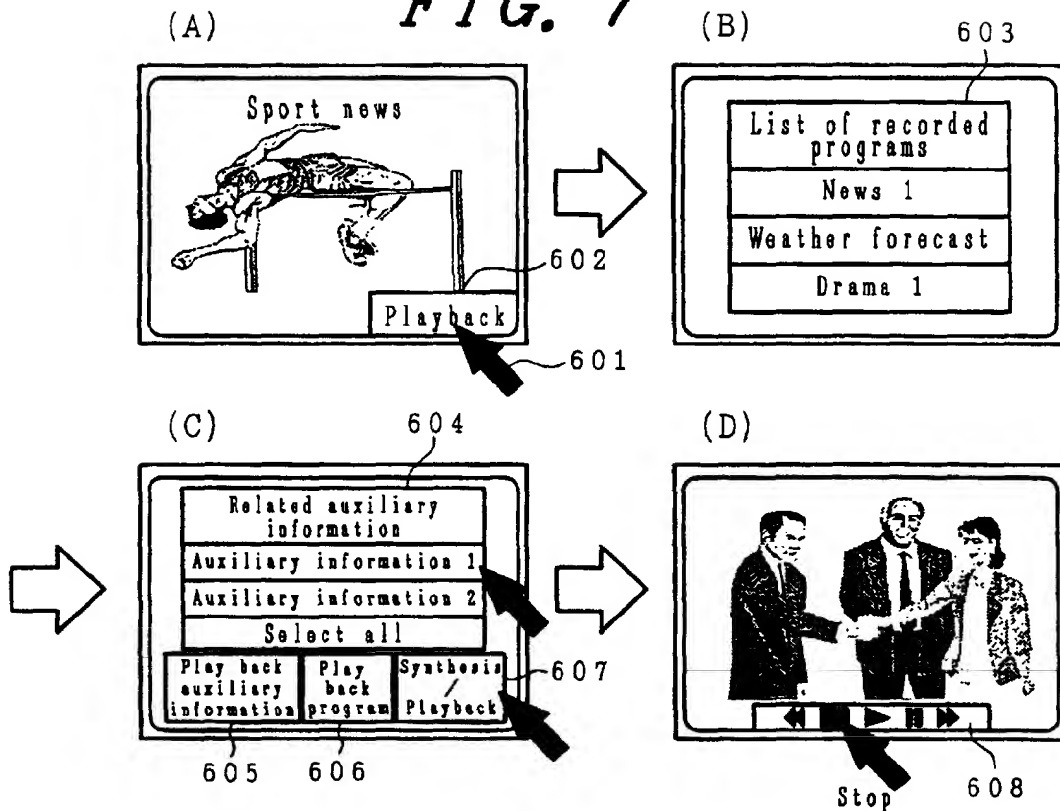
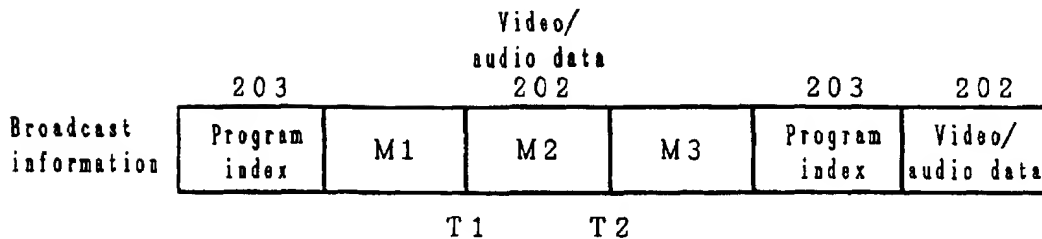
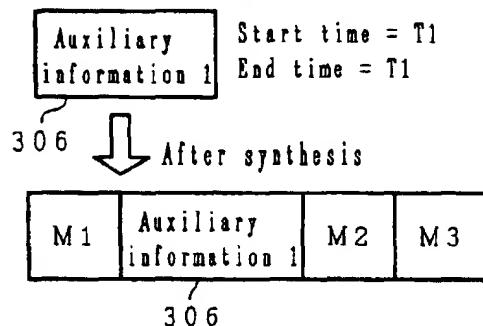


FIG. 8



(A) Insertion type synthesis



(B) Replacement type synthesis

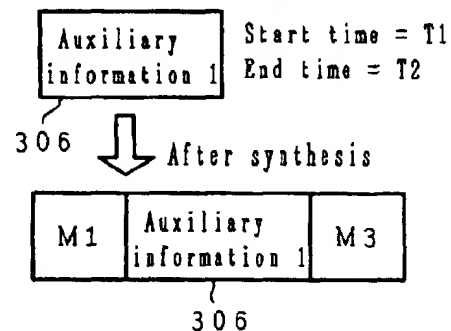


FIG. 9

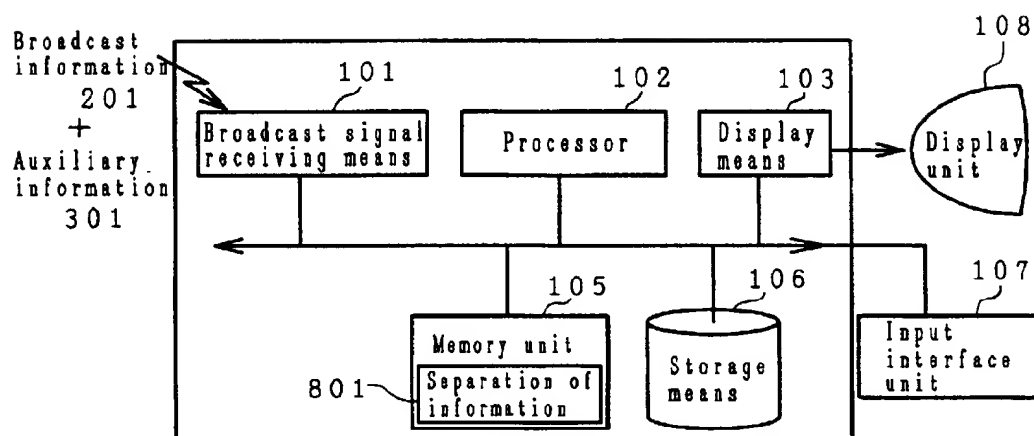


FIG. 10

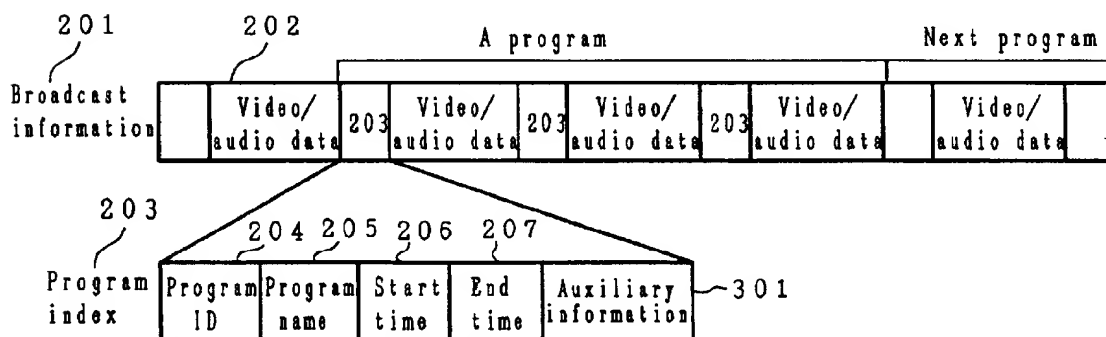
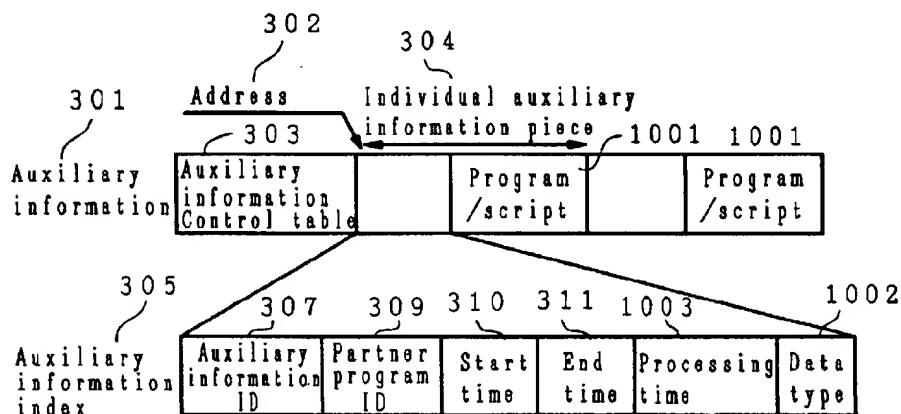


FIG. 11



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP98/02675

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl ⁶ H04N5/445, H04N7/08		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int.Cl ⁶ H04N5/44-5/45, H04N7/025-7-088		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1940-1996 Jitsuyo Shinan Toroku Koho 1996-1998 Kokai Jitsuyo Shinan Koho 1971-1996		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP, 10-051752, A (K.K.Infocity), 20 February, 1998 (20. 02. 98) & WO, 9743855, A1	1, 2, 3, 8, 10 11, 12
X Y	JP, 09-149328, A (NEC Engineering K.K.), 6 June, 1997 (06. 06. 97)	1, 2, 10 11, 12
X Y	US, 5,726,702, A (HITACHI, LTD.), 10 March, 1998 (10. 03. 98)	1, 2, 10 11, 12
Y	JP, 05-064167, A (Hitachi,Ltd.), 12 March, 1993 (12. 03. 93) & US, 5502497, A	11, 12
A	US, 5,724,103, A (INTEL CO.), 3 March, 1998 (03. 03. 98)	1-21
A	DE, 3,340,572, A (HITACHI, LTD.), 24 May, 1984 (24. 05. 84)	1-21
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* "A" Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
Date of the actual completion of the international search 2 March, 1999 (02. 03. 99)		Date of mailing of the international search report 16 March, 1999 (16. 03. 99)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)